Abstract

Introduction: The prevalence of photoaging and sun-related skin cancers increased worldwide. To reduce these damages, application of sunscreens is recommended. There are three main parameters for evaluation of sunscreens efficacy: sun protection factor (SPF) and protection against UVA rays and water resistance. These parameters are assessed by invitro or invivo methods. Invivo methods imitate the real conditions of sunscreens protection against the UV irritation. However, these methods suffer from ethical considerations. In contrast, invitro methods propose important advantageous such as reproducibility and availability, ease and low cost of experiments. In this study, the above-mentioned factors have been evaluated in sunscreen product which currently are used in the market of Iran.

Methods: 20 products available in the Iranian market with SPF labels ranged from 25 to 90 under two groups of domestically produced or foreign products, were purchased from reliable resources. To measure SPF, the absorption of the product in the range of 290-320 nm using UV spectrophotometer was recorded and the SPF was calculated using the Mansur formula. For measuring the protection ability of products against UVA radiation, the critical wavelength (CW) was measured using the surface below the UV absorption spectrum in the range of 320-400 nm. The water resistance of the products was also calculated according to the SPF measured before and after water immersion.

Results: The calculated SPF for these products was significantly different from their labeled SPF. The measured values were in the domain of 9.46 to 50.57. There was no significant difference between two Iranian or foreign groups. Also, the difference between sunscreens according to their composition of chemical or mineral ingrediants was not significant. CW of 3 products in the values of 375, 371, 372 nm showed the ability of protection against UVA rays with a critical wavelength above 370 nm. There was significant difference between the groups in this term. Water resistance was calculated in the values between 89.44% and 41.6%.

Conclusion: The invitro method for measuring these factors was fast, accessible and reproducible. None of these factors were significantly different in the two groups of domestic and foreign products.but protection against UVA radiation in group of mineral composition was low. Water resistance was higher for products with higher SPF labeling.

Keywords

Sun protection factor, water resistance factor, UVA